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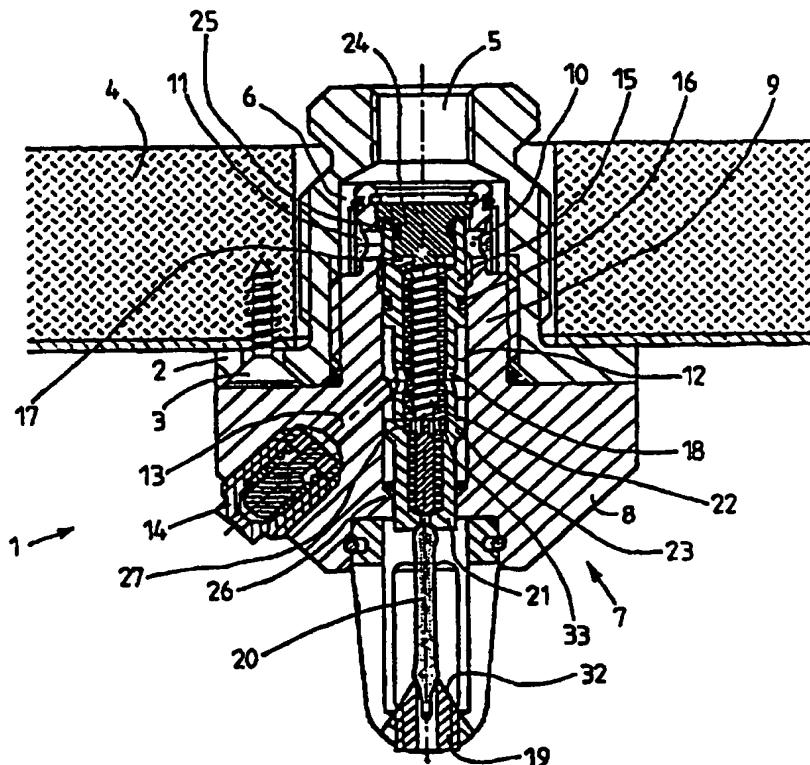
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(54) Title: SPRINKLER**(57) Abstract**

The present invention relates to a sprinkler which in stand-by mode comprises a heat-sensitive releasing device (20) in close contact with a spindle (15). In order to provide a new sprinkler which ensures even and straight load on the releasing device (20) and which also guarantees even spreading of extinguishing liquid in the form of liquid fog, the sprinkler is characterized in that the spindle (15) is mounted in a channel (12) with a liquid inlet (10) and outlet (13) to preferably obliquely positioned nozzles (14), and bears slidably or almost slidably against the wall of the channel (12) on both sides of the liquid inlet (10) for balancing the liquid pressure at the liquid inlet when the sprinkler is in stand-by mode, and that a nozzle (27) centrally directed in relation to the obliquely positioned nozzles is provided at the end of the spindle (15) which faces the releasing device (20).



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Sprinkler

5 The present invention relates to a sprinkler
which in stand-by mode comprises a heat-sensitive
releasing device in close contact with a spindle. More
specifically, the invention relates to a sprinkler
comprising a body provided with at least one nozzle, a
liquid inlet and a passage for supplying extinguishing
medium to at least one nozzle, the sprinkler in stand-by
10 mode comprising a heat-sensitive releasing device in
close contact with a spindle displaceably mounted in a
liquid passage with an inlet and outlet to said nozzle.

15 The releasing device can be, for example, a
glass ampoule which breaks at an elevated temperature.
In order to ensure rapid release, it is desirable to
make the ampoule as thin as possible. Even a thin
ampoule resists a sufficiently heavy mechanical load if
the load is exerted directly on the end of the ampoule
and is even.

20 SE 501 267 discloses a sprinkler of this kind.
However, the known sprinkler does not allow a high
liquid pressure to prevail in the liquid inlet when the
sprinkler is in stand-by mode, and therefore rapid
release of the sprinkler is not possible. In this known
25 sprinkler, a high liquid pressure would exert such a
great force on the releasing device that the releasing
device would break or. In order to avoid breakage, the
releasing device should have a special construction.

30 The object of the present invention is to
provide a new sprinkler which ensures even and straight
load on the releasing device; the load is not so heavy
that the releasing device can break merely by the action
of the liquid pressure when the sprinkler is in stand-by
mode.

The sprinkler according to the invention is characterized in that the liquid passage consists of a channel against whose wall the spindle bears slidably or almost slidably, said spindle and channel extending to both sides of the inlet of the channel for at least partial balancing of the liquid pressure at the inlet when the sprinkler is in stand-by mode, and that a nozzle centrally directed in relation to the obliquely positioned nozzles is provided at that end of the spindle which faces the releasing device. Preferred embodiments of the sprinkler are disclosed in appended claims 2 to 4.

In the following, the invention will be described in greater detail with reference to an embodiment shown in the accompanying drawings, in which

Figure 1 is a longitudinal section of an embodiment of the invention in stand-by mode,

Figure 2 shows the sprinkler of Figure 1 in released mode,

Figure 3 is an end view of the sprinkler, seen from below.

In Figures 1 and 2, reference numeral 1 denotes a sprinkler. The sprinkler comprises a housing 2, which is secured to a ceiling 4 by a plurality of screws 3; the housing 2 is provided with a liquid inlet 5, which extends through the ceiling 4 and continues as a central channel 6. The sprinkler is further provided with an insert 7 comprising a housing 8 which is attached to the sprinkler housing 2, for instance, by means of a head 9 screwed in the central channel 6 and tightened against it.

The head 9 of the insert housing 8 comprises a plurality of inlet openings 10 which are connected through a filter 11 to the liquid inlet 5 and which lead to a central channel 12 in the head 9. The central

channel 12 branches off through branchings 13 to a plurality of obliquely positioned nozzles 14. A spindle 15 is slidably mounted in the central channel 12 of the insert housing 8. When the sprinkler is in stand-by mode, as shown in Figure 1, the spindle 15 is sealed against the head 9 by means of a sealing 16 below the liquid inlet openings 10. The central channel 12 extends to both sides of the liquid inlet openings 10 to prevent the liquid pressure from exerting too great a downward force on the spindle 15 when the sprinkler is in stand-by mode.

The spindle 15 is also provided with a central channel 17 (hereafter: spindle channel) which below the spindle sealing 16 is connected via openings 18 to the central channel 12 of the head 9 and therefrom via the branchings 13 to the nozzles 14.

A holder 19 for a releasing device 20, e.g. an ampoule of a heat-sensitive glass-like material which softens and/or melts at an elevated temperature, is mounted on the bottom of the insert housing 8. The inner end of the ampoule 20 is fitted into the outer end portion 21 of the spindle 15, through which it is loaded by a spring 22 provided in the central channel of the spindle. The end of the spring 22 that faces the ampoule 20 bears against the bottom of the spindle channel 17 at a shoulder 33, whereas its opposite end bears against a plug 24 which is mounted in the head and sealed against the inside of the spindle channel 17 by means of an annular sealing 25. Alternatively, the shoulder 33 can be positioned higher in the spindle channel 17, and an adjustable stopper can be used instead of the plug 24.

The force of the spring 22 and the (typically very small) annular area of the sealing 16, on which the liquid pressure acts at the inlet openings 10, are

dimensioned in such a manner that they do not break the ampoule 20 when its temperature is normal in stand-by mode as shown in Figure 1. If the part of the spindle 15 that is located above the sealing 16 is in close contact with the surrounding wall of the head 9 on both sides of the inlet openings 10, the liquid pressure is in complete balance; only the spring 22 presses the spindle.

In stand-by mode illustrated in Figure 1, there is, because of sealing 25, no liquid connection from the inlet openings 10 through the upper end of the spindle channel 17 to the nozzles 14; the direct connection is closed by sealing 16.

If the ampoule 20 breaks or at least softens because of hot gases or active heating by means of a heating coil (not shown) and yields under the force of the spring 22, as shown in Figure 2, the spindle 15 strikes down until a shoulder 23 provided on said spindle interlocks tightly with a shoulder 26 provided in the insert housing 8. The spindle 15 moves a sufficiently long way to provide a connection for the liquid from the inlet openings 10 through the channel 12 in the head 9 past the sealing 25 to the spindle channel 17 and further to the nozzles 14 via openings 18 in the spindle 15. The nozzles 14 are preferably of such a type that they operate under high pressure and spray penetrating extinguishing liquid in the form of liquid fog in accordance with, for example, patent application PCT/FI92/00155.

Before the insert 7 is mounted, the ampoule 20 and the spindle construction 15, including the spring 22, are positioned in the insert housing 8. Thereafter the insert 7 is mounted in its entirety. It is thus easy to carry out careful mounting without damaging the ampoule, which is sensitive to shocks and uneven load.

5 The outer end portion 21 of the spindle 15,
i.e. the end which faces the ampoule 20, is provided
with a nozzle 27 having preferably the same basic con-
struction as the nozzles 14 with a coil spring 28 around
a nozzle pin 29. In the released position shown in
Figure 2, the liquid, in addition to flowing out through
the nozzles 14, also flows from the spindle channel 17
through openings 30 in between and along the spirals of
the spring 28 through a nozzle opening 31 and spreads
10 through oblique spread surfaces 32 provided at the outer
end of the holder 19.

 The central nozzle 27 at the end of the spindle
15 ensures that there is no "hole" in the liquid fog
produced by the sprinkler.

Claims

1. A sprinkler comprising a body (2, 8) in which at least one nozzle (14) has been mounted, said
5 body being provided with a liquid inlet (5) and a passage (6, 10, 12, 13) for supplying extinguishing medium to at least one nozzle (14), the sprinkler in stand-by mode comprising a heat-sensitive releasing device (20) in close contact with a spindle (15) dis-
10 placeably mounted in a liquid passage (12) with an inlet (10) and an outlet (13) to obliquely positioned nozzles (14), c h a r a c t e r i z e d in that the liquid passage consists of a channel (12) against whose wall the spindle (15) bears slidably or almost slidably, said
15 spindle and channel (12) extending to both sides of the inlet (10) of the channel (12) for at least partial balancing of the liquid pressure at the inlet when the sprinkler is in stand-by mode, and that a nozzle (27) centrally directed in relation to the oblique nozzles
20 (14) is provided at the end of the spindle (15) which faces the releasing device (20).

2. A sprinkler according to claim 1, c h a r -
a c t e r i z e d in that
when the sprinkler is in stand-by mode, the
25 spindle (15) is sealed (25) between the inlet (10) and the point of inflow of the spindle channel (17),
when the sprinkler is released, the spindle (15) is arranged to be displaced so that the connection from the inlet (10) past said sealing (25) to the inflow
30 end of the spindle channel (17) is opened, and
said centrally directed nozzle (27) is provided as a direct extension of the spindle channel (17).

3. A sprinkler according to claim 2, c h a r -
a c t e r i z e d in that a spring (22) is provided in
35 the spindle channel (17), bearing partly against a

shoulder (33) in the spindle channel and partly against a plug (24) to displace the spindle (15) when the sprinkler is released.

5 4. A sprinkler according to claim 1 or 2, characterized in that the holder (19) of the releasing device (20) is provided with at least one obliquely positioned spread surface (32) outside the outlet opening (31) of the centrally directed nozzle (27).

10 5. A sprinkler according to any one of the preceding claims 1 to 4, characterized in that the lower portion of the spindle channel (17) is provided with a spiral liquid channel defined by a coil spring (28) surrounding a nozzle pin (29).

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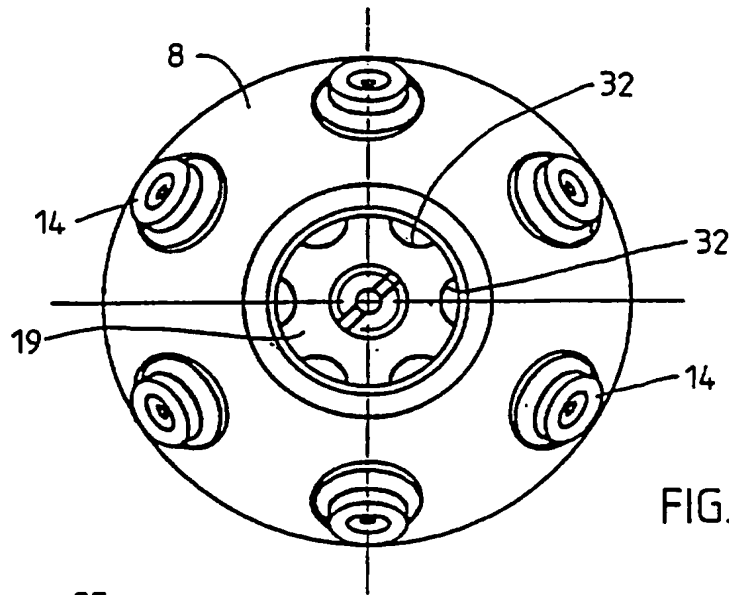


FIG. 3

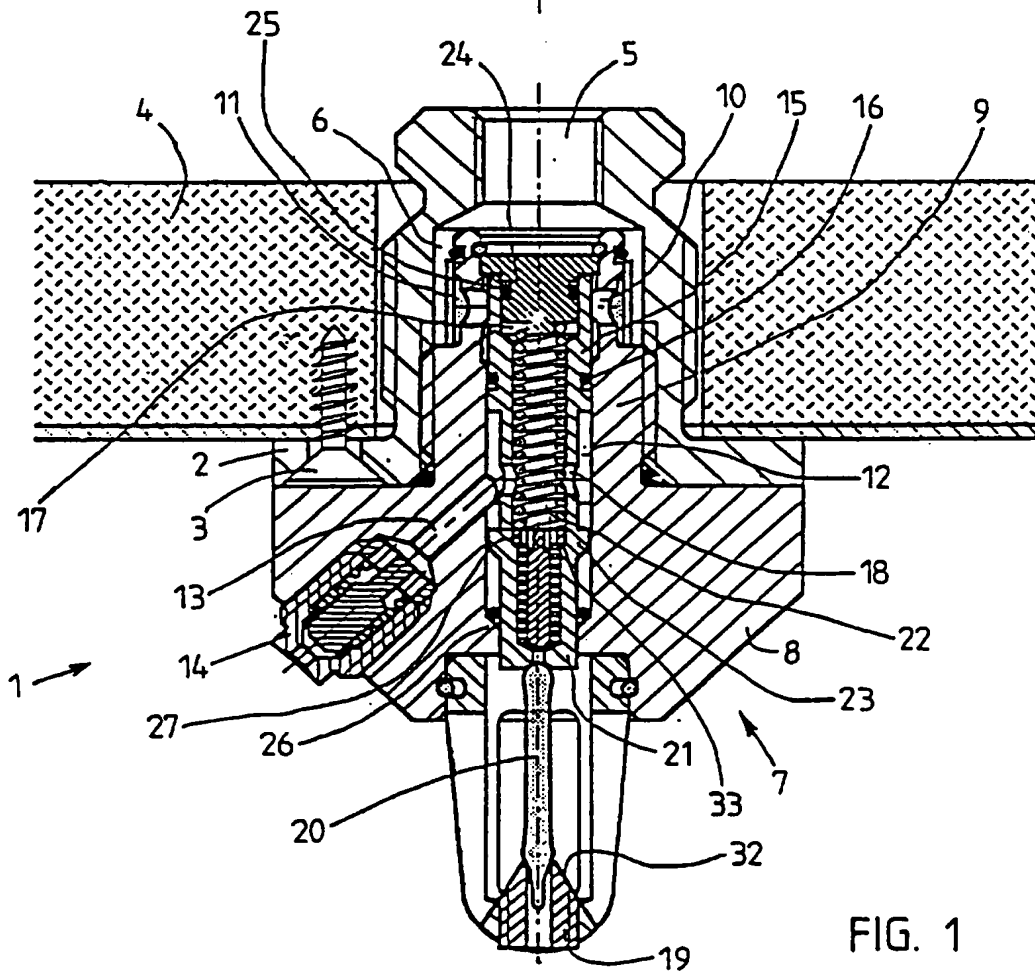


FIG. 1

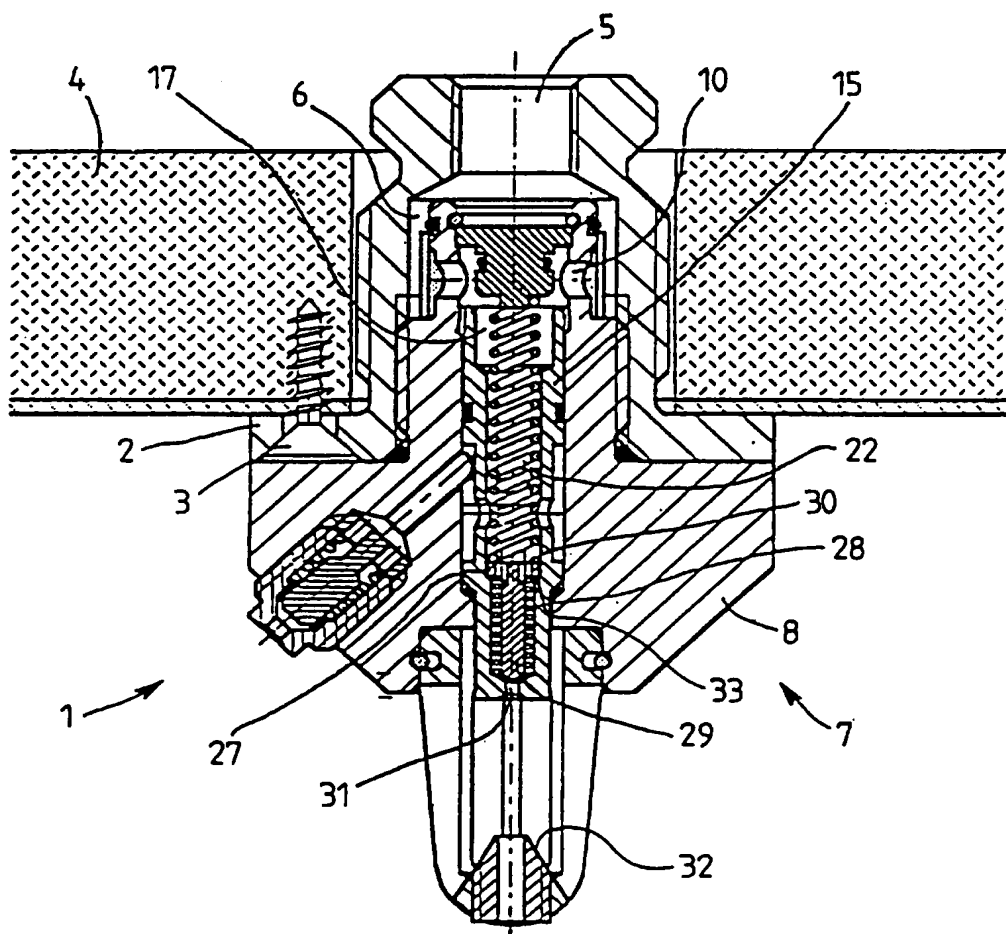


FIG. 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 95/00495

A. CLASSIFICATION OF SUBJECT MATTER		
IPC6: A62C 31/05, A62C 37/14 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
IPC6: A62C		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
SE,DK,FI,NO classes as above		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	WO 9425112 A1 (HTC I AMAL AB), 10 November 1994 (10.11.94), figure 1 --	1
X	WO 9215370 A1 (SUNDHOLM, GÖRAN), 17 Sept 1992 (17.09.92), figure 14 Y	1,3,4
Y	--	5
Y	WO 9406567 A1 (SUNDHOLM, GÖRAN), 31 March 1994 (31.03.94), figure 11, detail 63 --	5
A	WO 9321998 A1 (SUNDHOLM, GÖRAN), 11 November 1993 (11.11.93) --	
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>WO 9416771 A1 (SUNDHOLM, GÖRAN), 4 August 1994 (04.08.94)</p> <p style="text-align: center;">-- -----</p>	

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

11/12/95

PCT/FI 95/00495

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO-A1-	9425112	10/11/94	NONE	
WO-A1-	9215370	17/09/92	AU-B- 662727	14/09/95
			AU-A- 1327192	06/10/92
			BR-A- 9205688	17/05/94
			EP-A- 0665761	09/08/95
			AU-A- 1971492	12/01/93
			BR-A- 9206163	22/11/94
			CA-A- 2111232	23/12/92
			EP-A- 0589956	06/04/94
			FI-A,D- 935717	14/02/94
			JP-T- 6511160	15/12/94
			NO-A,D- 934651	09/02/94
			WO-A- 9222353	23/12/92
WO-A1-	9406567	31/03/94	NONE	
WO-A1-	9321998	11/11/93	NONE	
WO-A1-	9416771	04/08/94	NONE	